

What Is Claimed Is:

1. A semiconductor laser module comprising:
a semiconductor laser; and
control means for controlling wavelength of the
5 light wave radiated from the semiconductor laser,
wherein

said wavelength is controlled by a heating
element involving no Peltier cooling.

2. A semiconductor laser module according to
claim 1, wherein said semiconductor laser module has no
10 Peltier cooling means.

3. A semiconductor laser module according to
claim 2, wherein said heating element generates heat
depending upon size of a driving signal from a
15 temperature control unit.

4. A semiconductor laser module, comprising a
semiconductor laser; a driving circuit for driving said
semiconductor laser; a heating element for controlling
temperature of said semiconductor laser; a temperature
sensor for sensing temperature near or around said
semiconductor laser and said heating element; and a
temperature control unit for controlling said heating
element on the basis of temperature information from
said temperature sensor, wherein

25 said temperature control unit controls said
heating element without the use of Peltier cooling
means so as to keep said semiconductor laser at the
same temperature as ambient air temperature or higher

*sub
as
cancel*

than it.

5. A semiconductor laser module according to claim 4, wherein said ambient air temperature is temperature outside a package of said semiconductor laser module.

6. A semiconductor laser module according to claim 5, wherein said semiconductor laser module has no Peltier cooling means.

7. A semiconductor laser module according to claim 6, wherein said heating element generates heat depending upon size of a driving signal from said temperature control unit.

8. A semiconductor laser module, comprising: a semiconductor laser; a driving circuit for driving said semiconductor laser; a heating element for controlling the temperature of said semiconductor laser without involving a Peltier cooling operation; a temperature sensor for sensing temperature near or around said semiconductor laser and said heating element; and a temperature control unit for controlling said heating element on the basis of temperature information from said temperature sensor, wherein

said temperature control unit controls said heating element so as to keep said semiconductor laser at the same temperature as ambient air temperature or higher than it.

9. A semiconductor laser module according to claim 8, wherein said ambient air temperature is

temperature outside a package of said semiconductor laser module.

10. A semiconductor laser module according to claim 9, wherein said semiconductor laser module has no Peltier cooling means.

11. A semiconductor laser module according to claim 9, wherein said heating element generates heat depending upon size of a driving signal from said temperature control unit.

10 12. A semiconductor laser module according to claim 4, wherein said semiconductor laser module further comprises a supporting substrate, at least said semiconductor laser, wherein said heating element and said temperature sensor are mounted on top of said supporting substrate, and wherein said heating element controls temperature of said supporting substrate together with said semiconductor laser and said temperature sensor.

20 13. A semiconductor laser module according to claim 12, wherein said semiconductor laser is a Fabry-Perot type laser.

14. A semiconductor laser module according to claim 12, wherein said semiconductor laser is a distribution return shape laser.

25 15. A semiconductor laser module according to claim 12, wherein said semiconductor laser is a distribution return shape laser formed on the same substrate together with a field absorption modulator.

16. A semiconductor laser module according to claim 12, wherein said semiconductor laser is not cooled by Peltier cooling, but is heated by said heating element and is kept at substantially constant temperature within a predetermined temperature range, and a wavelength of light is kept substantially constant within a predetermined wavelength range to be emitted from said semiconductor laser.

17. A semiconductor laser module, comprising:
a semiconductor laser; a driving circuit for driving said semiconductor laser; a heating element for controlling temperature of said semiconductor laser; a temperature sensor for sensing temperature near or around said semiconductor laser and said heating element; a temperature control unit for controlling said heating element on the basis of temperature information from said temperature sensor; and a supporting substrate, wherein

at least said semiconductor laser, said heating element and said temperature sensor are mounted on a main surface of said supporting substrate, wherein

a main surface of a semiconductor chip of said semiconductor laser, on which joining for emitting laser light has been formed, is disposed on said main surface of said supporting substrate, wherein

said heating element is disposed in proximity to said joining on said main surface of said semiconductor chip of said semiconductor laser on said main surface

of said supporting substrate, and wherein

5 said temperature control unit controls said heating element so as to keep said semiconductor laser at the same temperature as ambient air temperature or higher than it.

18. A semiconductor laser module according to claim 17, wherein said ambient air temperature is temperature outside a package of said semiconductor laser module.

10 19. A semiconductor laser module according to claim 18, wherein said semiconductor laser module has no Peltier cooling means.

15 20. A semiconductor laser module according to claim 19, wherein said heating element generates heat depending upon size of a driving signal from said temperature control unit.

20 21. A semiconductor laser module according to claim 17, wherein said heating element is disposed between said main surface of said semiconductor chip of said semiconductor laser and said main surface of said supporting substrate.

25 22. A semiconductor laser module according to claim 21, wherein said ambient air temperature is temperature outside the package of said semiconductor laser module.

23. A semiconductor laser module according to claim 22, wherein said semiconductor laser module has no Peltier cooling means.

24. A semiconductor laser module according to claim 23, wherein said heating element generates heat depending upon size of a driving signal from said temperature control unit.

5 25. An optical transceiver comprising an optical receiving module and an optical transmitting module, wherein said optical transmitting module comprises: a semiconductor laser; a driving circuit for driving said semiconductor laser; a heating element for
10 controlling temperature of said semiconductor laser without involving any Peltier cooling operation; a temperature sensor for sensing temperature near or around said semiconductor laser and said heating element; and a temperature control unit for controlling
15 said heating element on the basis of temperature information from said temperature sensor, wherein said temperature control unit controls said heating element so as to keep said semiconductor laser at the same temperature as ambient air temperature or higher than
20 it, and wherein

said optical transmitting module and said optical receiving module are housed within one housing.

26. An optical transceiver according to claim 25, wherein said ambient air temperature is temperature
25 outside said housing.

27. An optical transceiver according to claim 25, wherein said optical transceiver has no Peltier cooling means.

09739692-122000

28. An optical transceiver according to claim 27, wherein said heating element generates heat depending upon size of a driving signal from said temperature control unit.

29. An optical receiver, comprising: a semiconductor photo detector for receiving an optical information signal from a recording medium or a communication system; a signal processing unit for processing an electric signal from said semiconductor photo detector; a heating element for controlling temperature of said semiconductor photo detector; a temperature sensor for sensing temperature near or around said semiconductor photo detector and said heating element; a temperature control unit for controlling said heating element on the basis of the temperature information from said temperature sensor, wherein

said temperature control unit controls said heating element without the use of the Peltier cooling means so as to keep said semiconductor photo detector at the same temperature as ambient air temperature or higher than it.

30. An optical receiver according to claim 29, wherein said ambient air temperature is temperature outside the package of said optical receiver.

31. An optical receiver according to claim 30, wherein said optical receiver has no Peltier cooling means.

32. An optical receiver according to claim 31,
wherein said heating element generates heat depending
upon size of a driving signal from said temperature
control unit.

5

00022T" 2696E 260